

1 DISC VALVE INTERMEDIATE RING SEAL

2
3 BACKGROUND OF THE INVENTION

4 The invention is an intermediate ring seal placed in sliding
5 contact at its upper ring surfaces with a rotatively mounted disc valve
6 in an engine cylinder head. A sealing ring groove machined on the
7 outer perimeter surface of the said ring holds a seal which is fixedly
8 held by a pin in stationary contact with the inner surfaces of the engine
9 cylinder.

10 In previous designs and proprietary illustrations, the stationary
11 sealing contact has been in the cylinder head. In the present invention
12 a ringed skirt has been placed within the inner diameter of the disc
13 valve gear and extended downward over the outer surfaces of the
14 engine cylinder. The stationary seal of the intermediate ring in the
15 present invention is now at the engine cylinder inside surfaces.

16 The novelty of the present invention is in the method of sealing
17 the combustion chamber of a rotary disc valve engine between the
18 cylinder head and the engine cylinder. At the cylinder the intermediate
19 ring seal provides a static seal with the engine cylinder by a seal
20 operating within a seal groove machined into the outer surface of the
21 intermediate ring seal. By this description, it can be seen that the
22 intermediate ring seal comprises both dynamic and static sealing
23 characteristics as a sealing interface between the rotating surfaces of
24 the disc valve and stationary sealing surfaces of the engine cylinder.

25 Dynamic and static sealing between the rotating disc valve and
26 stationary engine cylinder must occur within the limited axial length of
27

1 the combustion volume. To alleviate this restrictive spatial requirement
2 a skirt extension has been added to the disc valve which extends the
3 axial length of the sealing contact between the dynamic seal and
4 stationary seal without changing the combustion volume which would
5 change the engine compression ratio and alter its performance.

6 The novelty of the invention is the extension of the axial distance
7 between the dynamic seal and stationary sealing surfaces such that they
8 overlap the interface between the cylinder head and engine cylinder,
9 facilitating engine component manufacture and installation of the
10 cylinder head on the engine cylinder with improved sealing reliability.
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12 SUMMARY OF THE INVENTION
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14 The invention is a new and improved method of sealing the
15 combustion volume of a disc valve engine. The seal must provide
16 dynamic sealing against the sliding surfaces of the disc valve and also
17 provide static seal with the engine cylinder. These seals must be
18 effective in the limiting axial length of the combustion volume
19 measured as the distance between the engine piston crown and the
20 cylinder head surface configured within the confining surface of the
21 disc valve. To facilitate the sealing function the intermediate ring seal
22 is designed to overlap the interface between the engine cylinder head
23 and engine cylinder.

24 It is a primary objective of the invention to place a skirt
25 extension on the disc valve that will overlap the interface between the
26 engine cylinder head and the engine cylinder.

27 It is another objective of the invention to place the intermediate
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1 ring seal between the engine cylinder and the disc valve extension.

2 It is yet another object of the invention to place a static seal
3 between the said engine cylinder and said intermediate ring seal.

5 BRIEF DESCRIPTION OF THE DRAWINGS

6 Drawings are presented showing the method of extending the
7 lower portion of the disc valve to form a cylindered skirt. The
8 drawings also show the method of installing an intermediate ring seal
9 to provide a dynamic seal with the sliding surface of the disc valve and
10 the static seal with the engine cylinder.

12 Figure 1 Is the bottom view of the disc valve.

14 Figure 2 Is a side view of the disc valve of Fig. 1 sectioned
15 diagonally.

17 Figure 3 Is a side view of the intermediate ring seal.

19 Figure 4 Is a top view of the intermediate ring seal.

22 Figure 5 Is a view of the assembly of the interfacing elements of the
23 disc valve skirt with the static seal of the intermediate ring
24 seal with the engine cylinder and the dynamic sliding seal
25 with the disc valve sliding surfaces, shown in partial cross-
26 section.

1 DETAILED DESCRIPTION OF THE INVENTION

2 In the detailed description of the invention, and its manner of
3 operation, only three major components are required to define the
4 novel features of the design.

- 5
- 6 • Rotating disc valve
7 • Intermediate ring seal
8 • Stationary engine cylinder

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10 The novel feature of the invention is the facilitation of the
11 intermediate ring seal to effectively seal the combustion chamber of an
12 engine by forming a dynamic sliding seal with the rotating disc valve
13 and a static seal with the stationary engine cylinder within the limiting
14 axial distance of the combustion volume when the engine piston is at
15 top-dead-center at the end of its compression stroke. The novelty of
16 the effective static sealing is achieved by extending the under side of
17 the disc valve to form a cylindrical skirt that extends over the engine
18 cylinder allowing for an intervening space for the intermediate ring to
19 seal against the said engine cylinder.

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21 Turning now to FIG. 1 of the drawings. FIG. 1 is the bottom
22 view of the disc valve 1 showing the intake port 2 and exhaust port 3,
23 gear teeth 4, skirt 5, and sealing surface 6. The novel feature of the
24 disc valve of FIG. 1 is skirt 5.

25 FIG. 2 is a side view of the disc valve 1 shown in cross-section
26 taken across FIG. 1. In this view the disc valve axle 7 and spark plug
27 threaded hole 8 are shown. Disc valve 1 is rotatively mounted in the

1 engine cylinder head bearings which hold disc valve axle 7. Rotation
2 of disc valve 1 opens and closes intake port 2 and exhaust port 3 in a
3 synergistic manner with corresponding two ports in the cylinder head.
4 Those skilled-in-the-art will readily recognize that disc valve 1 may
5 have a plurality of intake ports 2 and exhaust ports 3 at slow rates of
6 rotation relative to engine crankshaft revolution without effecting the
7 novelty of design. In this description only one intake port 2 and one
8 exhaust port 3 are shown for clarity and simplification of the
9 description.

Turning now to FIG. 3. FIG. 3 is a side view of the intermediate ring seal 9. A groove 10 (not shown in this view) is machined on the outer perimeter of the said intermediate ring seal 9 to hold a stationary seal 11. At the bottom edge of intermediate ring seal 9 is a recess 12 for accepting a staking pin 16 (not shown in this view) for holding the intermediate ring seal in place and preventing its rotation.

FIG. 4 is a top view of the intermediate ring seal 9.

Turning now to FIG. 5. FIG. 5 shows the assembly of the disc valve 1, intermediate ring seal 9, and the engine cylinder 13 in partial cross-section. The sliding seal surface between the intermediate ring seal 9 and the disc valve 1 is shown as dynamic interface 14. The stationary seal 11 in contact with engine cylinder 13 is shown as static interface 15.

1 Numbered Elements of the Drawings
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- 3 1. disc valve
4 2. intake port
5 3. exhaust port
6 4. gear teeth
7 5. skirt
8 6. sliding seal surface
9 7. disc valve axle
10 8. threaded hole
11 9. intermediate ring seal
12 10 seal groove
13 11. stationary seal
14 12. groove
15 13. engine cylinder
16 14. dynamic interface
17 15. static interface
18 16. pin
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